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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
PATHAK, SUDHANSHU C	

ART UNIT	PAPER NUMBER
2634	6

DATE MAILED: 07/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/964,758	SHIMIZU, HIROAKI	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *September 28th, 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *September 28th, 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-to-29 are pending in the application.

Specification

2. The disclosure is objected to because of the following informalities:

   - On Page 19, line 13 describes a signal modulation circuit in a cellular phone referring to Fig. 2 & Fig. 4; this should actually refer to Fig. 3 & Fig. 4 as further described on Page 19, line 20 of the specification.
   - On Page 23, line 9, describes "is applied as frequency a converter 7", this should actually be "is applied to a frequency converter 7".

   Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

   (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, 6, 9-14, 15, 19-22 & 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumm et al. (5,745,526) in view of Norris (Transmitter Architectures, 1998 IEE, Pages 4/1-to-4/6) in further view of Faulkner et al. (5,420,536).

Regarding to Claims 1, 3, 6, 9, 10, 12, 15, 19-20, 22 & 25-26, Kumm discloses a modulation circuit for obtaining a modulated signal (Abstract, lines 1-8 & Fig. 1). Kumm also discloses means for extracting (Fig. 1, element 10) a phase signal (Fig.

1, elements "I", "Q", 16, 18) and amplitude signal (Fig. 1, element 30 & Column 2, lines 35-45) from the modulated signal (Fig. 1, element 8). Kumm further discloses means for converting the phase signal into an analog signal (Fig. 1, elements 12, 14). Kumm further discloses means for varying the amplitude of the RF signal and amplifying the varied RF signal in accordance with the amplitude signal output and for outputting the amplified RF signal (Abstract, lines 3-8 & Column 1, lines 30-52 & Column 2, lines 22-67 & Column 4, lines 1-9 & Claim 2 & Fig. 1, elements 22-34). However, Kumm does not disclose a first means for generating a first oscillation frequency and a means for generating a second oscillation frequency; means for modulating, in use of quadrature modulation the analog phase signal to an IF signal base on the first oscillation signal; means for converting the frequency of the IF signal into an RF signal, based on the second oscillation frequency signal; and means for delaying the amplitude signal for a time.

Norris discloses transmitter circuits for mobile telephone handsets to provide for good RF performance at high efficiencies and in a compact implementation (Page 4/1, Overview, lines 1-4). Norris also discloses a GSM transmitter wherein the IQ (quadrature) modulator creates a modulated signal at some IF frequency and this is further mixed with a synthesized RF local oscillator to provide a transmitted signal at the RF frequency wherein mismatches on IQ balance can be minimized by modulating at a low carrier frequency (GSM architectures, Page 4/2-to-Page 4/4 & Fig. 2-6). Norris discloses a heterodyne architecture for mobile radio handsets for various different standards (GSM, CDMA etc.) i.e. the baseband signal is up-

converted in quadrature to an IF frequency and then further up-converted to an RF frequency for transmission, thus providing a 2-stage conversion (Fig.'s 2-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Norris teaches an analog modulator implemented as an heterodyne architecture and this can be implemented in the transmitter as described in Kumm so as to provide a transmitter circuit for mobile handset to provide with good RF performance at high efficiencies and in a compact technology and to minimize frequency or phase pulling of the transmitter. However, Kumm in view of Norris does not disclose a means for delaying the amplitude signal for a time.

Faulkner discloses a linearized power amplifier comprising a dynamic bias modulation circuit for modulating an operating voltage of the amplifier (Abstract, lines 1-7 & Fig. 7). Faulkner also discloses the bias modulating circuit to include an envelope determining circuit and signal processing circuits so as to provide improved spectral control and high efficiency for the amplifier (Abstract, lines 7-24). Faulkner further discloses implementing multiple delay blocks to improve the operation of the dynamic bias circuits so as to equalize the delay paths between the bias signal with the transmitted signal at the amplifier, wherein the delay block is added in the signal path which offer the smaller delay so that the overall delay is the same between both the signal paths (Column 9, lines 67-68 & Column 10, lines 1-14 & Column 3, lines 25-30 & Fig.'s 7, 14, elements 66a, b). Faulkner further discloses implementing the amount of delay to be set depending on the configuration of the transmitter and as needed (Column 10, lines 4-10). Therefore, it would have been

obvious to one of ordinary skill in the art at the time of the invention that Faulkner teaches implementing a delay block and this can be implemented in the transmitter as described in Kumm in view of Norris so as to synchronize the amplitude (envelope) signal with the transmitted signal so as to synchronize the amplitude of the amplified RF signal with the envelope of the modulating signal so as to provide a improves spectral control of the RF transmitted signal. Furthermore, there is no criticality in implementing the delay block before or after the amplitude extracting means (envelope detector) is a matter of design.

Regarding to Claims 2, 11, 18 & 24, Kumm in view of Norris in further view of Faulkner discloses a radio transmitter implemented in a heterodyne architecture so as to comprise an IF and RF stages comprising means for extracting a phase and amplitude signal from the modulating signal and a delay means the amplitude signal for a time desired as described above. Kumm further discloses a power amplifying circuit for calculating a mean value of power values each of which corresponds to an output signal from the modulating signal and amplifying the amplified RF signal output from the varying means based on the mean value (Column 2, lines 22-64 & Fig. 1, elements 22-34, "monitored power level" & Claim 1). Kumm further discloses a reference power signal designating the output electric power to be transmitted, and being input into the amplifier (Fig. 1, element "power ref"). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Kumm in view of Norris in further view of Faulkner satisfies the limitation of the claim.

Regarding to Claims 4 & 13, Kumm in view of Norris in further view of Faulkner discloses a radio transmitter implemented in a heterodyne architecture so as to comprise an IF and RF stages comprising means for extracting a phase and amplitude signal from the modulating signal and a delay means the amplitude signal for a time desired as described above. Kumm further discloses the modulating circuit comprising setting means includes a circuit for setting the time based on at least one signal format of modulating signal, and the ambient temperature (Column 1, lines 39-53 & Fig. 1, element 32 & Column 2, lines 50-55). Norris further discloses providing control depending on the frequency of the modulating signal (Fig. 2-4, 7 & Page 4/6, Dual band architectures & Page 4/4, GSM architectures). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Kumm in view of Norris in further view of Faulkner satisfies the limitation of the claim.

Regarding to Claims 5, 14, 21 & 27, Kumm in view of Norris in further view of Faulkner discloses a radio transmitter implemented in a heterodyne architecture so as to comprise an IF and RF stages comprising means for extracting a phase and amplitude signal from the modulating signal and a delay means the amplitude signal for a time desired as described above. Kumm further discloses that the bias modulation circuit correcting the bias signal to correct the linearity of the controlling gain variation in the varying means using an equation or conversion table (Abstract, lines 5-8 & Column 1, lines 10-28 & Column 2, lines 62-67 & Column 3, lines 1-10 & Claims 1, 5). Therefore, it would have been obvious to one of ordinary skill in the art

at the time of the invention that the delay block as described in Kumm in view of Norris in further view of Faulkner can be implemented so as to control the bias modulation circuitry so as to provide a linear signal from the power amplifier, thus satisfying the limitations of the claim.

5. Claims 7-8, 16-17, 23 & 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kumm et al. (5,745,526) in view of Norris (Transmitter Architectures, 1998 IEE, Pages 4/1-to-4/6) in further view of Faulkner et al. (5,420,536) in further view of Wilson (WO 00/31881).

Regarding to Claim 7-8, 16-17, 23 & 28-29, Kumm in view of Norris in further view of Faulkner discloses a radio transmitter implemented in a heterodyne architecture so as to comprise an IF and RF stages comprising means for extracting a phase and amplitude signal from the modulating signal and a delay means the amplitude signal for a time desired as described above. However, the above-mentioned references do not contain the first, second and third filters, the first and second counters, the multiplier and the phase difference detector.

Wilson discloses a phase synchronization modulation loop comprising a first filter to limit the band of the IF signal (Fig. 3, element 1); a first counting down circuit to divide the frequency of the IF signal (Fig. 3, element 35); a multiplier to multiply the second oscillation frequency signal and the RF signal (Fig. 3, element 310); a second filter to limit the frequency band of the output signal from the multiplier (Fig. 3, element 311); a second counting down circuit to divide the frequency of the output signal (Fig. 3, element 312); a phase difference detector to detect the phase

difference between the output signals from the first and second counting down circuits (Fig. 3, element 36) and a third filter to smooth the signal corresponding to the detected phase difference (Fig. 3, element 37). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Wilson teaches a phase synchronization modulation loop comprising of the elements as described above, and this can be implemented in the heterodyne transmitter architecture as described in Kumm in view of Norris in further view of Faulkner so as to provide a spectrally pure and synchronized RF signal to the data to be transmitted, thus satisfying the limitations of the claims.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (703)-305-0341. The examiner can normally be reached on M-F: 9am-6pm.

    - If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703)-305-4714.
    - The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

- Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

STEPHEN CHIN
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